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EXAMINER

ONEILL, KARIE AMBER

ART UNIT PAPER NUMBER

1745

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Please find below and/or attached an Office communication concerning this application or proceeding.

8

<b>Office Action Summary</b>	<b>Application No.</b> 10/699,454	<b>Applicant(s)</b> SAULSBURY ET AL.	
	<b>Examiner</b> Karie O'Neill	<b>Art Unit</b> 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 August 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23, 44-63 and 71-77 is/are pending in the application.
- 4a) Of the above claim(s) 24-43, 64-70 and 78-90 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23, 44-63, 71-77 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10-31-2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>10-31-03, 3-1-04, 3-1-06, 3-7-06</u> | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of Group I, Claims 1-23, 44-63 and 71-77, in the reply filed on August 25, 2006 is acknowledged. The traversal is on the ground(s) that there no serious burden on the examiner to search three distinct inventions. This is not found persuasive because regardless of search method, inventions with different limitations will require different search strategies, and the time to consider the relevancy of collective references would increase proportionally as well. Therefore, Claims 24-43, 64-70 and 78-90 were withdrawn from consideration.

The requirement is still deemed proper and is therefore made FINAL.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3, 5-6, 11, 15-17, 44-47, 49-50, 53, 56-57, 60-61, 71, 74 and 76-77 are rejected under 35 U.S.C. 102(b) as being anticipated by Gibb et al. (US 5,484,666).

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With regard to Claim 1, Gibb et al. disclose, in Figure 1, a fuel cell assembly (10), comprising: a plurality of fuel cell assemblies (16), each of the fuel cell assemblies comprising: a first flow field plate (20); a second flow field plate (22); and a membrane electrode assembly (18) interposed between the first and second flow field plates and having an active area (column 3 lines 55-61); a plurality of registration apertures called headers (42, 46, 52, 56) defined in each of the MEA, the first flow field plate and the second flow field plate, the respective registration apertures or headers situated within non-active areas of the MEA when the first and second flow field plates and the MEA are axially aligned within the stack assembly, the registration apertures having an inner surface (column 6 lines 24-32); and a plurality of registration posts or tie rods (60a, 60b, 60c, 60d) configured for reception within the plurality of apertures or headers, each of the registration posts or tie rods having an outer surface differing in shape from a shape of the inner surface of the registration apertures or headers, the inner surface of the registration apertures or headers contacting the outer surface of the registration posts at a plurality of discrete press fit locations. The inner shape of the registration apertures or headers are seen in Figure 1 to be in the shape of squares or rectangles and the outer surface of the registration posts or tie rods are seen to be cylindrical and in direct contact with the inner surface of the headers through which they pass or extend.

With regard to Claims 2, 3, 5, and 6, Gibb et al. disclose in Figure 1, wherein the shape of the outer surface of the tie rods defines a convex curved shape, the shape of the outer surface of the tie rods defines a circular or elliptical shape as can be seen by the rounded rod shape, the shape of the inner surface of the headers defines a polygon

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or square or rectangular shape, and wherein the shape of the inner surface of the headers defines a polygon and the shape of the outer surface of the tie rods defines a circle or an ellipse.

With regard to Claim 11, Gibb et al. discloses the registration post or tie rod comprising a solid core member formed of a resilient material (column 4 lines 8-10).

With regard to Claims 15 and 16, Gibb et al. disclose the fuel cell stack assembly comprising sets of the fuel cell assemblies (16) and sets of registration posts or tie rods (60a-60d), each of the tie rods associated with two or more of the fuel cell assembly sets (column 1 lines 64-66) and wherein each of the tie rods extends between opposing end plates (12, 14) of the fuel cell stack (column 6 lines 24-27).

With regard to Claim 17, Gibb et al. disclose in Figure 2, wherein the registration apertures or headers comprise an entrance lead-in and an exit lead-in by having a recessed portion or cavity used for mounting the stack of disc springs which provide compressive force to the stack (column 2 lines 3-5 and column 7 lines 1-2).

With regard to Claim 44, Gibb et al. disclose, in Figure 1, a fuel cell sub assembly (16) for incorporation in a fuel cell stack (10), comprising: a flow field plate (20 or 22); a membrane electrode assembly (18) positioned adjacent the flow field plate and having an active area (column 3 lines 55-61); a plurality of registration apertures called headers (42, 46, 52, 56) defined in each of the MEA and flow field plate, the respective registration apertures or headers situated within non-active areas of the MEA when the flow field plate and the MEA are in axial alignment, the registration apertures having an inner surface (column 6 lines 24-32); and a plurality of registration posts or tie rods

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(60a, 60b, 60c, 60d) configured for reception within the plurality of apertures or headers, each of the registration posts or tie rods having an outer surface differing in shape from a shape of the inner surface of the registration apertures or headers, the inner surface of the registration apertures or headers contacting the outer surface of the registration posts at a plurality of discrete press fit locations. The inner shape of the registration apertures or headers are seen in Figure 1 to be in the shape of squares or rectangles and the outer surface of the registration posts or tie rods are seen to be cylindrical and in direct contact with the inner surface of the headers through which they pass or extend.

With regard to Claim 45, Gibb et al. disclose the flow field plate being configured as a bipolar flow field plate, wherein one side serves as an anode plate for one cell and the other side of the flow field plate serves as the cathode plate for the adjacent cell (column 1 lines 66-67 and column 2 lines 1-2).

With regard to Claims 46, 47, 49 and 50, Gibb et al. disclose in Figure 1, wherein the shape of the outer surface of the tie rods defines a convex curved shape, the shape of the outer surface of the tie rods defines a circular or elliptical shape as can be seen by the rounded rod shape, the shape of the inner surface of the headers defines a polygon or square or rectangular shape, and wherein the shape of the inner surface of the headers defines a polygon and the shape of the outer surface of the tie rods defines a circle or an ellipse.

With regard to Claim 53, Gibb et al. discloses the registration post or tie rod comprising a solid core member formed of a resilient material (column 4 lines 8-10).

With regard to Claim 56, Gibb et al. disclose in Figure 2, wherein the registration apertures or headers comprise an entrance lead-in and an exit lead-in by having a recessed portion or cavity used for mounting the stack of disc springs which provide compressive force to the stack (column 2 lines 3-5 and column 7 lines 1-2).

With regard to Claims 57, 60 and 61, Gibb et al. disclose in Figure 1, wherein the registration posts or tie rods have a length greater than a total height of the flow field plate and the MEA, a length greater than the total height of more than two sets of MEA and flow field plates and wherein each of the tie rods extends through a portion of the flow field plate, the MEA, and at least a portion of the flow field plate of an adjacently positioned fuel cell sub-assembly (column 1 lines 64-67 and column 2 lines 1-5) because when connected in series, multiple fuel cell sub-assemblies are held together in the assembled state by tie rods.

With regard to Claim 71, Gibb et al. disclose a method of forming a fuel cell stack assembly (10), comprising: providing a first flow field plate (20), a second flow field plate (22), and a membrane electrode assembly (18) having an active area (column 3 lines 55-61), a plurality of registration apertures called headers defined in each MEA, the first flow field plate, and the second flow field plate; aligning the first and second flow field plates and the MEA so that the respective registration apertures or headers are in axial alignment, the registration apertures or headers having an inner surface (column 6 lines 24-32); providing a plurality of registration posts or tie rods (60a, 60b, 60c, 60d) having an outer surface differing in shape from a shape of the inner surface of the registration apertures or headers; and inserting the plurality of registration posts or tie rods into the

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plurality of registration apertures or headers so that the inner surface of the headers contact the outer surface of the registration posts at a plurality of discrete press fit locations, which can clearly be seen in Figure 1.

With regard to Claims 74, 76 and 77, Gibb et al. disclose in Figure 1, wherein the shape of the outer surface of the tie rods defines a circular or elliptical shape as can be seen by the rounded rod shape, the shape of the inner surface of the headers defines a polygon or square or rectangular shape, and wherein the shape of the inner surface of the headers defines a polygon and the shape of the outer surface of the tie rods defines a circle or an ellipse.

4. Claims 1-3, 8, 11-16, 19, 21, 44, 46-47, 53-55, 57, 60-61 and 71-74 are rejected under 35 U.S.C. 102(e) as being anticipated by Sugita et al. (US 6,620,540 B2).

With regard to Claim 1, Sugita et al. disclose in Figure 12, a fuel cell stack assembly (12), comprising: a plurality of fuel cell assemblies (32), each of the fuel cell assemblies comprising: a first flow field plate or separator (34); a second flow field plate or separator (36); and a membrane electrode assembly interposed between the first and second flow field plates and having an active area (column 4 lines 26-41); a plurality of registration apertures or holes as seen in Figures 1 and 10 (5) defined in each of the MEA, the first flow field plate and the second flow field plate, the respective registration apertures or holes situated within non-active areas of the MEA when the first and second flow field plates and the MEA are axially aligned within the stack assembly (column 6 lines 28-33), the registration apertures having an inner surface (column 6 lines 47-49); and a plurality of registration posts or rods (6) configured for reception



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within the plurality of apertures or holes, each of the registration posts or rods having an outer surface differing in shape from a shape of the inner surface of the registration apertures or holes, the inner surface of the registration apertures or holes contacting the outer surface of the registration posts at a plurality of discrete press fit locations (column 6 lines 8-19). The inner shape of the registration apertures or holes are seen in Figures 9 and 11 to be in the shape of ellipse or ovals and the outer surface of the registration posts or rods are seen to be cylindrical and in direct contact with the inner surface of the headers through which they pass or extend.

With regard to Claims 2, 3, and 8 Sugita et al. disclose in Figures 9 and 11, wherein the shape of at least one of the inner surface of the registration aperture or holes and the outer surface of the rods defines a convex curved shape, wherein the shape of at least one of the inner surface of the registration apertures or holes and the outer surface of the rods defines a circular or elliptical shape as can be seen by the rounded rod shape, and wherein the shape of the outer surface of the rods defines a circle and the shape of the inner surface of the holes defines an ellipse.

With regard to Claims 11-14, Sugita et al. disclose the registration post or rod (6) comprising a solid core member (6a) and a hollow member or insulator (6b) surrounding the outer surface of the rod, making up the insulator coated rod that is in contact with the inner surface of the registration aperture or hole (5). Figure 4 shows the insulator-coated rod (6) being made of a hollow outer member (6b) deforming its shape to fit around the solid core member (6a) or rod so as to prevent sliding of the insulator from the rod.

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With regard to Claims 15 and 16, Sugita et al. disclose in Figure 10, the fuel cell stack assembly (12) comprising a horizontal laminate of a plurality of fuel cell assemblies (32) and sets of registration posts or rods (6), each of the rods associated with two or more of the fuel cell assembly sets (column 2 lines 25-38) and wherein each of the rods extends between opposing end plates (24) of the fuel cell stack (column 5 lines 25-26).

With regard to Claims 19 and 21, Sugita et al. disclose a fuel cell stack mounted onto a vehicle in order to supply power to the vehicle and supply power to a load, which is the vehicle (column 1 lines 35-38).

With regard to Claim 44, Sugita et al. disclose, in Figure 12, a fuel cell sub assembly (32) for incorporation in a fuel cell stack (12), comprising: a flow field plate or separator (34,36); a membrane electrode assembly positioned adjacent the flow field plate or separator and having an active area (column 4 lines 26-41); a plurality of registration apertures called holes (5) defined in each of the MEA and flow field plate, the respective registration apertures or holes situated within non-active areas of the MEA when the flow field plate and the MEA are in axial alignment, the registration apertures having an inner surface (column 6 lines 28-33); and a plurality of registration posts or rods (6) configured for reception within the plurality of apertures or holes, each of the registration posts or rods having an outer surface differing in shape from a shape of the inner surface of the registration apertures or holes, the inner surface of the registration apertures or holes contacting the outer surface of the registration posts at a plurality of discrete press fit locations (column 6 lines 8-19). The inner shape of the

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registration apertures or holes are seen in Figures 9 and 11 to be in the shape of an ellipse or oval and the outer surface of the registration posts or rods are seen to be cylindrical and in direct contact with the inner surface of the headers through which they pass or extend.

With regard to Claims 46 and 47 Sugita et al. disclose in Figures 9 and 11, wherein the shape of at least one of the inner surface of the registration aperture or holes and the outer surface of the rods defines a convex curved shape, wherein the shape of at least one of the inner surface of the registration apertures or holes and the outer surface of the rods defines a circular or elliptical shape as can be seen by the rounded rod shape.

With regard to Claims 53-55, Sugita et al. disclose the registration post or rod (6) comprising a solid core member (6a) and a hollow member or insulator (6b) surrounding the outer surface of the rod, making up the insulator coated rod that is in contact with the inner surface of the registration aperture or hole (5).

With regard to Claim 57 and 60-61, Sugita et al. disclose in Figure 10, wherein the registration posts or rods have a length greater than a total height of the flow field plate and MEA, a length greater than a total height of more than two sets of the flow field plates and MEAs and wherein each of the rods extends through a portion of the flow field plates, the MEA and at least a portion of a flow field plate of an adjacent fuel cell assembly (column 2 lines 25-38). The fuel cell stack comprises a horizontal laminate of a plurality of fuel cell sub-assemblies comprising separators or flow field

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plates and MEAs sandwiched between the separators, each with a hole for fastening the rods in a laminating direction.

With regard to Claim 71, Sugita et al. disclose a method of forming a fuel cell stack assembly, comprising, providing a first flow field plate or separator (34), a second flow field plate or separator (36) and an MEA having an active area (column 4 lines 37-42), a plurality of registration apertures or holes (5) defined in each of the MEA, the first flow field plate and the second flow field plate (column 6 lines 28-32); aligning the first and second flow field plates or separators and the MEA so that the registration holes are in axial alignment (see Figure 12), the holes having an inner surface (column 6 line 14); providing plurality of rods having an outer surface differing in shape from a shape of the inner surface of the registration holes (see Figures 9 and 11); and inserting the plurality of registration posts or rods into the registration holes so that the inner surface of the holes contact the outer surface of the rods at a plurality of discrete press-fit locations (column 6 lines 7-18).

With regard to Claims 72-73, Sugita et al. disclose the registration post or rod (6) comprising a solid core member (6a) and a hollow member or insulator (6b) surrounding the outer surface of the rod, making up the insulator coated rod that is in contact with the inner surface of the registration aperture or hole (5).

With regard to Claim 74, Sugita et al. disclose the shape of at least one of the inner surface of the registration apertures or holes and the outer surface of the registration posts or rods defines a circular or an elliptical shape (see Figures 9 and 11).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4, 7-10, 48, 51-52 and 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gibb et al. (US 5,484,666), as applied to Claims 1-3, 5-6, 11, 15-17, 44-47, 49-50, 53, 56-57, 60-61, 71, 74 and 76-77 above.

Gibb et al. disclose the fuel cell stack assembly, the fuel cell sub-assembly for incorporation in a fuel cell stack assembly, and a method of forming a fuel cell stack assembly in paragraph 3 above.

Gibb et al. do not disclose wherein the shape of at least one of the inner surface of the registration apertures and the outer surface of the registration posts defines a generally curved shape comprising a plurality of concave or protruding portions, wherein the shape of one of the inner surface of the registration apertures and the outer surface of the registration posts defines a first polygon, and the shape of the other of the inner surface of the registration apertures and the outer surface of the registration posts defines a second polygon, wherein the shape of one of the inner surface of the registration apertures and the outer surface of the registration posts defines a circle, and the shape of the other of the inner surface of the registration apertures and the outer surface of the registration posts defines an ellipse, wherein the shape of the inner

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surface of the registration apertures defines a triangle, and the outer surface of the registration posts defines a circle, wherein the shape of the inner surface of the registration apertures defines a circle, and the registration posts defines a core member and a plurality of protrusions outwardly projecting from the core member, wherein the shape of one of the inner surface of the registration apertures and the outer surface of the registration posts defines a triangle, and the shape of the other of the inner surface of the registration apertures and the outer surface of the registration posts defines a circle. It would have been an obvious matter of design choice to provide the registration apertures and registration posts in different shapes, since such a modification would have involved a mere change in the shape of a component. A change of shape is generally recognized as being within the level of ordinary skill in the art. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1996).

7. Claims 4-10, 48-52 and 75-77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugita et al. (US 6,620,540 B2), as applied to Claims 1-3, 8, 11-16, 19, 21, 44, 46-47, 53-55, 57, 60-61 and 71-74 above.

Sugita et al. disclose the fuel cell stack assembly, the fuel cell sub-assembly for incorporation in a fuel cell stack assembly, and a method of forming a fuel cell stack assembly in paragraph 4 above.

Sugita et al. do not disclose wherein the shape of at least one of the inner surface of the registration apertures and the outer surface of the registration posts defines a generally curved shape comprising a plurality of concave or protruding

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portions, wherein the shape of at least one of the inner surface of the registration apertures and the outer surface of the registration posts defines a polygon, wherein the shape of one of the inner surface of the registration apertures and the outer surface of the registration posts defines a polygon, and the shape of the other of the inner surface of the registration apertures and the outer surface of the registration posts defines a circle or an ellipse, wherein the shape of one of the inner surface of the registration apertures and the outer surface of the registration posts defines a first polygon, and the shape of the other of the inner surface of the registration apertures and the outer surface of the registration posts defines a second polygon, wherein the shape of one of the inner surface of the registration apertures and the outer surface of the registration posts defines a circle, and the shape of the other of the inner surface of the registration apertures and the outer surface of the registration posts defines an ellipse, wherein the shape of the inner surface of the registration apertures defines a triangle, and the outer surface of the registration posts defines a circle, wherein the shape of the inner surface of the registration apertures defines a circle, and the registration posts defines a core member and a plurality of protrusions outwardly projecting from the core member. It would have been an obvious matter of design choice to provide the registration apertures and registration posts in different shapes, since such a modification would have involved a mere change in the shape of a component. A change of shape is generally recognized as being within the level of ordinary skill in the art. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1996).

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8. Claims 18, 58-59, 62 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gibb et al. (US 5,484,666), as applied to Claims 1-3, 5-6, 11, 15-17, 44-47, 49-50, 53, 56-57, 60-61, 71, 74 and 76-77 above, and Sugita et al. (US 6,620,540 B2), as applied to Claims 1-3, 8, 11-16, 19, 21, 44, 46-47, 53-55, 57, 60-61 and 71-74 above, and in further view of Mease (US 6,358,641 B1).

Gibb et al. disclose the fuel cell stack assembly, the fuel cell sub-assembly for incorporation in a fuel cell stack assembly, and a method of forming a fuel cell stack assembly in paragraph 3 above and Sugita et al. disclose the claimed invention in paragraph 4 above. Neither Gibb et al. nor Sugita et al. disclose wherein protrusion of the registration posts from a first fuel cell assembly facilitates identification of the second flow field plate of the first fuel cell assembly as an anode plate or a cathode plate of the first fuel cell assembly and wherein the registration posts of a first fuel cell sub-assembly facilitate registration between the first fuel cell sub-assembly and a flow field plate of a second fuel cell sub-assembly wherein the registration posts have a length greater than a total height of the flow field plate and MEA, but less than a total height of two sets of the flow field plates and MEAs, and wherein the registration posts have a length greater than a total height of two sets of the flow field plates and MEAs, but less than a total height of 5 sets of the flow field plates and MEAs.

Mease discloses in Figure 3, a fuel cell stack (10) including plate modules (12) that may be stacked together to form a fuel cell stack. Each plate module is formed of an anode and cathode with an MEA sandwiched in between (column 1 lines 28-40) and including at least one alignment pin (14) that extends through alignment holes (15). The



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alignment pins are used to align plates (6) of the plate modules by facilitating the identification of the plate as being an anode plate or a cathode plate in a process in which the shafts of the alignment pins extend through the diagonally opposed holes (15c, 15d) of the plate module and partially extend into the holes (15c, 15d) of a plate that do not include captured pins (column 4 lines 29-47). The alignment pins are also used to align plates of the plate modules (column 3 lines 8-10) wherein the alignment pins facilitate registration between the flow field plate of one fuel cell and the flow field plate of a second fuel cell (see Figure 4). Alignment pins may be shorter or longer depending on the number of plate modules in the stack. The plate modules have four alignment holes that are located near the four corners of the plate. Two pins may extend through diagonally opposed holes of each plate module to mate with an adjacent plate module. Because upper ends of the pins may extend beyond the upper face of the plate module the upper ends may mate with corresponding alignment holes of adjacent plate modules. By assembling the fuel cell stack in this manner the alignment pins have a length greater than a total height of the flow field plate and MEA, but less than a total height of two sets of the flow field plates and MEAs when stacking only 2 sets of plate modules together because the next plate module may not have corresponding alignment holes (column 4 lines 4-28), and a length greater than a total height of two sets of the flow field plates and MEAs, but less than a total height of 5 sets of the flow field plates and MEAs when stacking only 5 sets of plate modules together. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use registration posts or alignment pins that would facilitate the registration

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between fuel cell assemblies and between flow field plates and anode or cathode plates of the Gibb et al. and Sugita et al. fuel cell assemblies, because Mease teaches aligning plate modules so that the alignment pins don't slip out of the alignment holes and being able to align several plate modules with a "self-capturing" feature which captures the alignment pin between the plates of the module so that each plate module can be tested separately for problems such as leakage (column 2 lines 64-67).

9. Claims 20, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gibb et al. (US 5,484,666), as applied to Claims 1-3, 5-6, 11, 15-17, 44-47, 49-50, 53, 56-57, 60-61, 71, 74 and 76-77 above, and Sugita et al. (US 6,620,540 B2), as applied to Claims 1-3, 8, 11-16, 19, 21, 44, 46-47, 53-55, 57, 60-61 and 71-74 above, and in further view of Gamo et al. (US 5,976,725).

Gibb et al. disclose the fuel cell stack assembly, the fuel cell sub-assembly for incorporation in a fuel cell stack assembly, and a method of forming a fuel cell stack assembly in paragraph 3 above and Sugita et al. disclose the claimed invention in paragraph 4 above. Neither Gibb et al. nor Sugita et al. disclose a computer, an auxiliary power system and a residential heat and electricity cogeneration unit, wherein one or more of the fuel cell stack assemblies are incorporated in a fuel cell power unit configured to supply power to the computer, auxiliary power system and residential heat and electricity cogeneration unit.

Gamo et al. disclose a fuel cell system as an ideal power source for laptop computers (column 10 lines 55-59), a power generator for outdoor life, which would be

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an auxiliary power system (column 12 lines 20-21), and other electric appliances in which the heat produced would not had adverse thermal effects (column 10 lines 63-65). Therefore, at the time of the invention it would have been obvious to use the fuel cell system of Gibb et al. and Sugita et al. with other applications, because Gamo et al. teach the fuel cell being useful as the power source for applications in which smaller size and longer time of operation are necessary and demanded.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karie O'Neill whose telephone number is (571) 272-8614. The examiner can normally be reached on Monday through Friday from 8am to 5pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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KAO

  
DAH-WEI YUAN  
PRIMARY EXAMINER